REMARKS

Claims 1-14 are presented for consideration, with Claims 1, 4, 7, 10, 13 and 14 being independent.

Editorial changes have been made to the specification. In addition, a new abstract is being submitted to better set forth the technical aspects of Applicants' invention.

In the claims, Claims 1, 4, 7, 10, 13 and 14 have been amended to better set forth Applicants' claimed invention. For example, the phrase "existence ratio" in the claims has been deleted and it is now set forth that the design variable vector is a rate of existence to a structural member in each element. Support for this claim change can be found, for example, on page 4, lines 6-13 of the specification.

Claims 1-6, 13 and 14 are rejected under 35 U.S.C. §101 for allegedly being directed to non-statutory subject matter. Without conceding to the propriety of this rejection, Claims 1 and 4 have been amended to include the step of outputting the obtained solution. Additionally, Claims 13 and 14 have been amended and are now directed to a program stored in a computer-readable storage medium. Accordingly, reconsideration and withdrawal of the rejection under 35 U.S.C. §101 is deemed to be in order and such action is respectfully requested.

Claims 1, 2, 7, 8 and 13 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by the Patnaik publication. Claims 3 and 9 are rejected under 35 U.S.C. §103 as allegedly being obvious over Patnaik in view of the Lingen publication. Finally, Claims 4-6, 10-12 and 14 are rejected as allegedly being obvious over the Patnaik publication and further in view of the publication to Dickinson. These rejections are respectfully traversed.

Claim 1 of Applicants' invention relates to a method of optimally designing a structure comprising a step of obtaining a solution of a structure optimal designing problem having a first solution process to solve an optimization problem of a first evaluation function for a status variable vector and a design variable vector, with the status variable vector being a displacement in each node and the design variable vector being a rate of existence to a structural member in each element. The first solution process includes a design variable update step of reading the design variable vector and the status variable vector stored in a first storage unit, updating the design variable vector, and storing the updated design variable vector into the first storage unit. The status variable update step reads the design variable vector and the status variable vector stored in a second storage unit, updates the status variable vector, and stores the updated status variable vector into the second storage unit. As amended, Claim 1 recites that the status variable update step includes a second solution process to solve an optimization problem of a second evaluation function for the status variable vector and the design variable vector, wherein the second evaluation function corresponds a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, and the status variable vector is not initialized upon start of the second solution process. An output step outputs the obtained solution.

Claims 7 and 13 relate to an information processing apparatus and a program stored in a computer-readable storage medium, respectively, and correspond to Claim 1.

Claim 4 relates to a method of optimally designing a structure comprising the step of obtaining a solution of a structure optimal designing problem having a first solution

process to solve an optimization problem of the first evaluation function for a status variable vector and a design variable vector, wherein the status variable vector is a displacement in each node and the design variable vector is a rate of existence to a structural member in each element. As in Claim 1, Claim 4 includes a design variable update step and a status variable update step. Claim 4 further features a second solution process comprising a conjugate gradient method and a preconditioning step of executing preconditioning on a nodal force vector based on a global stiffness matrix.

Claims 10 and 14 relate to an information processing apparatus and a program stored in a computer-readable storage medium, respectively, and correspond to Claim 4.

Support for the claim amendments can be found, for example, in Figures 4 and 5 and the corresponding specification beginning on page 26, line 1. In accordance with Applicants' claimed invention, an optimal design of a structure can be achieved with high efficiency.

The primary citation to Patnaik relates to a procedure for automated structural design and is said in the Office Action to include a first solution process including a design variable update step and a second solution process including a status variable update step.

In contrast to Claim 1 of Applicants' invention, however, Patnaik is not understood to teach or suggest, among other features, that a second evaluation function corresponds a norm of a residual vector obtained as a difference between a nodal force vector and the status variable vector and, it follows, that the norm of the residual vector is used to solve an optimization problem of an evaluation function in the status variable update step. Patnaik also is

not understood to teach or suggest that a global stiffness matrix operates on the displacement vector X, which is compared to Applicants' claimed status variable vector in the Office Action. Claims 7 and 13 are submitted to be patentable for the same reasons.

Accordingly, reconsideration and withdrawal of the rejection of Claims 1, 2, 7, 8 and 13 under 35 U.S.C. §102(b) is respectfully requested.

The secondary citation to Lingen relates to a system which uses an iterative algorithm to solve non-symmetric systems of equations and was cited for its teaching of a conjugate residual (GCR) method. Lingen fails, however, to compensate for the deficiencies in Patnaik with respect to the independent Claims 1, 7 and 13 as discussed above. Therefore, without conceding to the propriety of combining of Patnaik and Lingen in the manner proposed in the Office Action, such a combination still fails to teach or suggest Applicants' invention. Therefore, reconsideration and withdrawal of the rejection of Claims 3 and 9 under 35 U.S.C. §103 is respectfully requested.

The secondary citation to Dickinson relates to conjugate gradient methods for three-dimensional linear elasticity and was cited for its teaching of a conjugate gradient method of recording a preconditioning step. Dickinson fails, however, to compensate for the deficiencies in Patnaik as discussed above with respect to Applicants' Claim 1, which features are also present in Claim 4. The proposed combination of Patnaik and Dickinson, therefore, even if proper, still fails to teach or suggest Claim 4 of Applicants' invention. Claims 10 and 14 are distinguished on the same grounds.

Accordingly, reconsideration and withdrawal of the rejection of Claims 4-6, 10-12 and 14 under 35 U.S.C. §103 is respectfully requested.

Therefore, it is submitted that Applicants' invention as set forth in independent Claims 1, 4, 7, 10, 13 and 14 is patentable over the cited art. In addition, dependent Claims 2, 3, 5, 6, 8, 9 and 11 set forth additional features of Applicants' invention. Independent consideration of the dependent claims is respectfully requested.

In view of the foregoing, reconsideration and allowance of this application is deemed to be in order and such action is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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